NATURAL AND CULTURAL RESOURCES MANAGEMENT PLAN

and ENVIRONMENTAL ASSESSMENT

Puukohola Heiau National Historic Site
Hawaii

Prepared by

PUUKOHOLA HEIAU NATIONAL HISTORIC SITE
NATIONAL PARK SERVICE
DEPARTMENT OF THE INTERIOR

DECEMBER 1982

NATURAL AND CULTURAL
RESOURCES MANAGEMENT PLAN
and Environmental Assessment

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Puukohola Heiau National Historic Site
National Park Service
Department of the Interior

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SUMMARY

This Puukohola Heiau Natural and Cultural Resources Management Plan proposes actions to maintain the natural environment, to restore where appropriate, and to stabilize the historic scene. Exotic plants will be removed and native plants will be re-established to represent, as nearly as possible, the landscape as it was in the 1790-1830 period.

Archeological and historical work will involve preservation to historical restoration. Such actions are proposed for the Puukohola Heiau, Mailekini Heiau, Pelekane area, Hale o Ka Puni Heiau, and John Young house complex.

Each proposed action will be documented in accordance with the Advisory Council's Procedures for the Protection of Historic and Cultural Properties (36 CFR 800) which governs compliance with Section 106 of the National Historic Preservation Act of 1966 and Executive Order 11593 of May 13, 1971. Also, actions will comply fully with all relevant legislation, such as provisions of the National Environmental Policy Act and Endangered Species Act.

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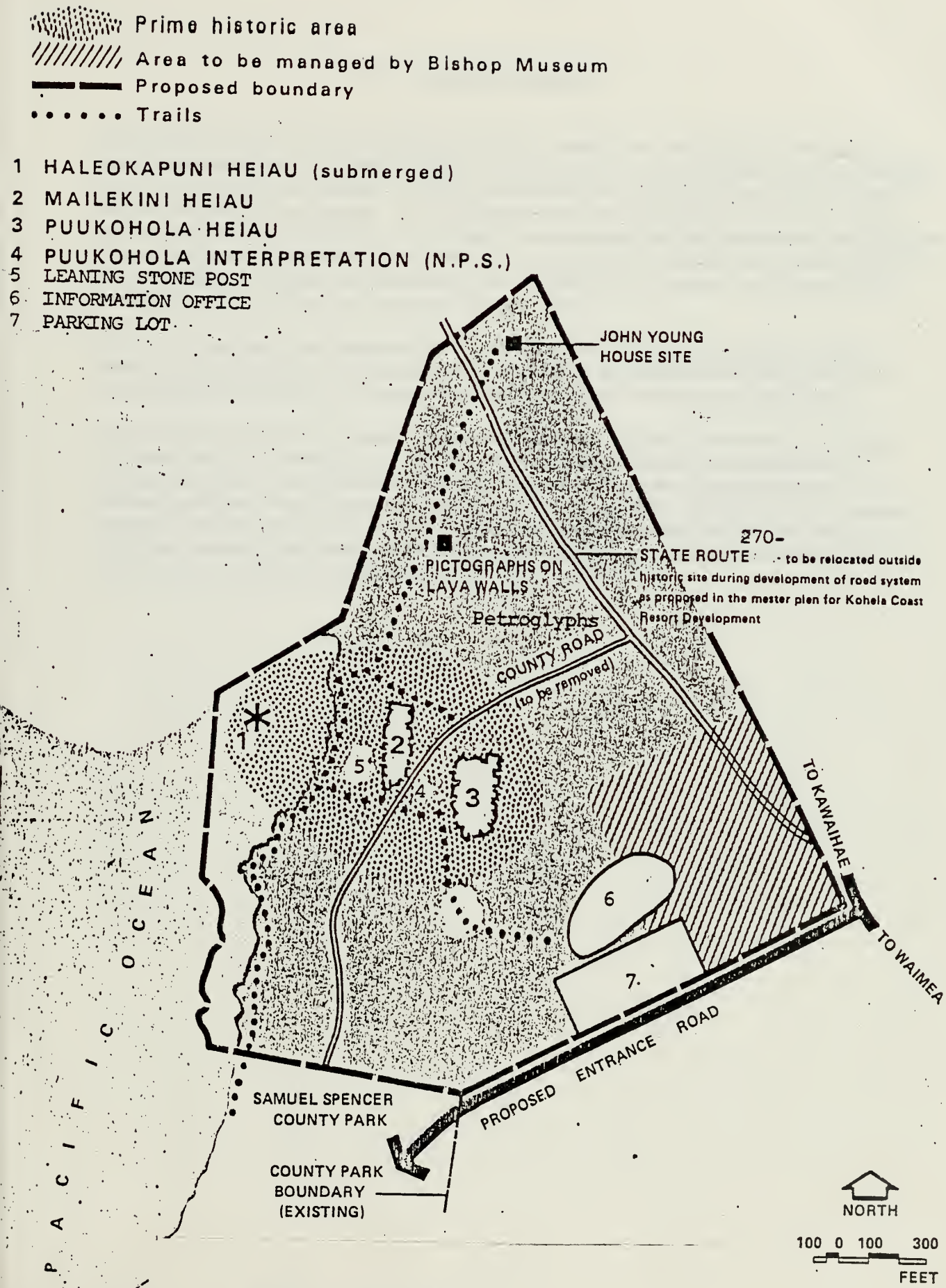

GENERAL DEVELOPMENT

FIGURE 1. MAP OF PUUKOHOLA HEIAU NATIONAL HISTORIC SITE

INTRODUCTION

The Puukohola Heiau National Historic Site, a registered national historical site near Kawaihae, South Kohala, Hawaii encompasses 77 acres set apart and authorized by act of Congress on August 7, 1972, to be preserved and protected for the benefit and inspiration of the people. It is administered and managed as a historical area of the National Park System. A composite natural and cultural resources management plan is proposed. The plan is an attempt to protect this example of a prime historic site surrounded by lands with potential for recreation and resort development and to mitigate, if possible, any adverse impacts upon it.

The prime cultural features are the Puukohola Heiau (temple), Mailekini Heiau, John Young's House Site, Pelekane area, and other stone structures and features. The schematic drawing of the area shows the cultural resources of this park.

The primary interpretive theme is the establishment of the Kamehameha dynasty in Hawaii and the formation of the Kingdom of Hawaii under Kamehameha I (or Kamehameha the Great) in the 1790's. Various sub-themes include contact with western culture (John Young, an English sailor who became Kamehameha's personal military advisor, was given the full title of chief and maintained his residence near the great temple), and pre-contact Hawaiian culture. (Hawaiian culture before 1778-1779, or before the Captain James Cook period.)

MANAGEMENT OBJECTIVES

The following resources management objectives have been developed in accordance with administrative policies for historical areas and the park's Statement for Management. These objectives will serve as the basis for park planning and development:

Obtain those lands and waters within the authorized boundary and acreage limitations adequate to preserve, manage, and interpret the significant historical features and events.

Restore the landscape to the period 1790-1830, the period of construction of Puukohola Heiau and residency of John Young.

Identify all historic remains, develop stabilization and restoration plans for those of prime historical and interpretive significance, and maintain them so as to preserve these resources.

Develop visitor use facilities.

Coordinate planning development and management of site with other historical and recreational sites in the County.

Maintain close contacts with local interest groups.

Continue and encourage the traditional Hawaiian uses of the land and sea.

Continue studies of archeological, historical, ecological, exotic vegetation control, and replanting of native plants in keeping with and in support of the overall interpretive development plans.

To meet the above objectives, a combination of research and management actions are proposed. Before any action is implemented, a determination of effect on the resource will be made, and consultations with the State Historic Preservation Officer will be requested. In cases of adverse impacts, a preliminary Case Report will be made to the State Historic Preservation Officer and the Advisory Council. The archeological and historical work will be under the direct supervision of the Pacific Archeologist and/or the Pacific Historian.

RESOURCES MANAGEMENT ACTIONS

OVERVIEW AND NEEDS: NATURAL ENVIRONMENT

Exotic plant control and native plant reintroduction

At Pu'uhonua ō Hōnaunau, Honaunau, Kona, Hawaii, a native plant nursery is being developed from where plants needed for Puukohola Heiau will be secured. Ongoing studies of plants growing in the area during the commemorated period (1790's) will provide guidelines for the reintroduction of certain native species of plants in the appropriate locations within the park.

Some native species including, but not limited to, the following are found in the area now:

Ipomoea congesta	blue morning glory
Cordia subcordata	kou
Thespia populnea	milo
Cocos nucifera	niu
Waltheria americana	hi'aloa
Heliotropium curassavicum	hinahina
Scaevola sp.	naupaka
Sida fallax	ilima

Most of the landscape is covered with an assortment of plants introduced after the period commemorated. These include the large thorny kiawe, or algaroba trees (Prosopis sp.) introduced in about 1828, and the buffel grass introduced circa 1935.

The vegetative ground cover is influenced by two factors -- rain and ground water from the ocean. The large kiawe trees in dense, nearly impenetrable strands are found immediately along the shore thinning away from the ocean and inland. The upland area, elevation 15 to 30.4 meters is mainly buffel grass with scattered, small kiawe trees. Approximately 20 acres, along the shore, have a heavy build-up of fuel from dead and dry kiawe and grasses, creating a potential fire danger involving fire safety and destruction of archeological resources. Proposed vegetative clearing and landscape restoration entails a combination of methods: Vegetation will be removed and replanted in controlled units by manual removal of trees, shrubs, and grasses with hand tools and chain saws. Stump application of an approved herbicide and broadcast spraying will be used where approved. Cut underbrush will be chopped into small degradable sections, piled, and allowed to decompose naturally. A replanting plan will be prepared by the CPSU to provide the soundest scientific base for this project and approved in conformance with research findings.

OVERVIEW AND NEEDS: CULTURAL RESOURCES

Restoring the Historic Scene

The historic scene is the overall appearance of all historic resources, including the landscape, sites, structures, and objects and their surroundings. Resources management encompasses actions of varying degrees -- preservation, stabilization, historical restoration, and reconstruction.

The Hawaiian style prehistoric structures are dry-laid, stacked-stone, and structurally weak. They are affected by visitor impacts as well as natural forces, such as wind, rain, root systems of trees and shrubs, as well as frequent earth tremors. The massive Puukohola and the Mailekini temple sites were originally constructed for a "one-time use" and not for long-term preservation. They were not meant to be impacted by large numbers of people over a long period of time. Therefore, efforts to preserve these stacked-stone structures start with a structure that has, built into it, "self-destructing" features. Preservation of Hawaiian stone structures requires special methods, materials, and techniques and a recognition of special conditions, both natural and cultural.

John Young's home, perhaps the first western style house built in Hawaii, is laid up in adobe mortar and is a special problem. A full research design, pre-stabilization report, and historic structures report will be prepared prior to any action. A Case Report will be prepared for consultation with the State Historical Preservation Officer and the Advisory Council. With the exception of John Young's House Site, there are no extensive excavation projects planned.

Puukohola Heiau

This temple site is on the National Register of Historic Places and is listed on the park's List of Classified Structures. The site has undergone emergency preservation treatment and is now ready for comprehensive stabilization. Under the emergency preservation action, all broken and weak sections of walls were carefully removed and the interior fill stabilized by arranging the stones into small terraces to help support and maintain the loose rubble fill. The face stones were laid in stacks nearby on top of the platform in readiness for the basic stabilization action. All support and compliance documents have been prepared, submitted, and approved.

The reconstruction of the actual temple, a thatched structure, and associated features will need to be looked into from the point of view of the language of the enabling legislation which mandates the restoration of the heiau and on the interpretive needs of the area.

Mailekini Heiau

Mailekini temple site has also undergone emergency preservation and is now ready for comprehensive stabilization. All compliance documents have been prepared, submitted, and approved. This temple will not be reconstructed.

John Young's House Site

This is probably the first western type home built in the Hawaiian Islands. The walls are laid in adobe mortar and plastered inside and out with coral cement. This major complex covers an area of about 20 by 40 meters near the confluence of two flood channels. The walls of the main house stand from one to two meters high, ground plan inside is about 3.80 by 6.0 meters. The standing portions are exposed through the rubble from the fallen walls. Two other structures of approximately the same size as the main house are located in the area. Only the first line of stones is showing on the surface (foundation). It appears the structures were robbed for other construction. A large Hawaiian style house platform, about 8 by 10 meters, is included in the complex. The house platform is in excellent condition. Two other areas appear to be associated with the Hawaiian style structure. A total of six features form the John Young's house complex. The Pacific Archeologist has done some excavation work in September 1978; however, the report has not been submitted to this office.

The site was mapped in detail in 1974. These maps will serve to guide additional research for structural details for restoration and reconstruction if justified. Stabilization procedures at this complex will consist of detailed drawings, photography, and clearing structural stones to expose standing walls and floors. A full detailed research design and a pre-stabilization study will be prepared (a preliminary case report in compliance with 36 CFR 800) prior to any action. The Pacific Historian has prepared a Historic Structures Report.

The main interpretive theme here is the life and times of John Young, an English sailor who became a trusted advisor to Kamehameha concerning all military matters. He was given full rank of chief, married a Hawaiian chiefess (Kamehameha's niece), and was governor of Hawaii island. The Hawaiian style house near the western style structure is undoubtedly Mrs. Young's house who refused to live in the haole style house. Based on the above documentation and development of a detailed interpretive plan, it may be justified to restore completely Young's house and reconstruct Mrs. Young's grass thatched house along with the other structures in the areas as called for in the enabling legislation. A meeting with the community was held on February 11, 1978 with 29 people in attendance. Until more research is accomplished, the National Park Service will remove all coverings over John Young's House Site and tidy it up for display and interpretation. Emergency preservation actions on Young's house consisted of building a plywood reinforcing wall around and over the structure to reduce wind, rain, and possible earthquake damage to the structure.

Pelekane Area

This area below and adjoining Mailekini Heiau was a complex of structures where Liholiho, Kamehameha II, came after the death of his father on May 8, 1819, because the heir-apparent could not remain in the district defiled by the death of a king until the priest said it was all right for him to return. Here, he consolidated his leadership role and also entertained State visitors in 1819.

This important area became the site of a rock-crushing plant during the 1940's and became a "graveyard" for discarded automobiles, boats, and other trash. These were removed in 1977 by contract.

Under the park's Development Concept Plan, the area was mapped to recover whatever information was not destroyed by recent activities. Also, a grid-by-grid search will be made to locate any structures and features described by Captain Louis De Freycinet in August 1819.

Hale O Ka Puni

A feature recorded on a 1883 map by George E. Greeley Jackson just offshore near a sandy beach area was apparently visible above the water surface. During below zero tide at 12:46 on November 19, 1975, the area of the reported site was dry. A search of the surface was made with only negative results. The water depth here is normally less than two feet with maximum three feet tides. This reported site is near the mouth of a flood stream that deposits silt in this tidal pool area. The depth of the silt and possible location of this site needs to be determined.

There is another site in the bay indicated on an 8 mm movie film that was recently donated to us that needs to be checked out.

With reference to the heiau, a study needs to be made of why the sharks congregate in this area for interpretive reasons. No one seems to know the real reason since no study has ever been made.

NOTES

NOTES

RELATIONSHIP TO OTHER PROJECTS

General Development Plan

A Development Area Plan is needed to determine the scope and location of visitor and management facilities, to finalize boundaries, and to complete land acquisition. Included in this plan are sociological, economical, and visitor use studies and a visitor use and interpretive plan. A Master Plan, Proposed Puukohola Heiau National Historic Site Hawaii, continues to serve as a General Management Plan.

Land Acquisition

Not all lands at Puukohola Heiau National Historic Site have not yet been officially transferred to the Federal Government. The lands have been donated by the Queen's Medical Center.

State Department of Health

Water quality of the county water is regularly monitored by the State Department of Health.

Bishop Museum

The preliminary master plan of this site mentions under management objectives, "to cooperate with the Bishop Museum in its project to establish an interpretive and research center adjacent to Puukohola." So far there has been no move made by Bishop Museum or the National Park Service to follow up on this project. We are inclined to abandon the project because the response has been cool to it.

Cooperative Park Studies Unit (CPSU)

The National Park Service has contracted with the University of Hawaii to do research work necessary to guide park managers in resource decisions. Reports on marine fauna, marine flora, and plant survey of this area have been completed.

ENVIRONMENTAL ASSESSMENT

SUMMARY

The Natural and Cultural Resources Management Plan for Puukohola Heiau National Historic Site proposes an action program to manage the area's resources. The environmental assessment analyzes the environmental impacts of the proposed actions.

The overall impact of the plan is to restore and maintain the landscape to the period commemorated, 1790-1830, and to protect and preserve the cultural remains in perpetuity. Vegetative clearing for landscape restoration will expose archaeological sites to visitor impacts but will control site destruction by root systems and prevent trees from being blown down by wind onto the sites. Archaeological and historical work ranges from preservation, stabilization, restoration, to construction. Prestabilization studies at John Young's House Site will involve excavation for which a detailed research design and prestabilization report is being prepared. A historic structures report is complete. This action will have the greatest impact including irreparable alteration of sub-surface layers and removal of portable artifacts. Stabilization of Puukohola and Mailekini heiau are in the final basic stabilization phase for which all compliance documents have been filed. A study plan for the Pekekane area and the reported Hale o Ka Puni will be prepared. There should be no effect on the site or the area. Reconstruction of surface structures at Puukohola Heiau must await full justification and development of an Interpretive Prospectus based on public input.

"No action" alternatives were considered thoroughly. No action to restore the landscape and to eradicate exotic vegetation will lead to an established exotic plant community. This is contrary to the period being commemorated, and the roots of exotic trees and wind-downed trees will continue to destroy the resources which we are charged to protect. Fuel buildup and fire hazard will threaten cultural resources and endanger human life. Lack of archaeological work will accelerate natural and human-caused erosion and loss of data will place the National Park Service in a position of noncompliance with internal procedures and external laws.

FINDING OF NO SIGNIFICANT IMPACT

The impacts of this proposed plan are limited. Based on these limited impacts and review of this environmental assessment, the National Park Service records a "finding of no signficant impact." Since this proposal does not constitute a major Federal action significantly affecting the human environment, an environmental impact statement will not be prepared.

Recommended:

Jerry Y. Shinoda

Superintendent, Puukohola Heiau NHS — December 23, 1982 (Date)

Approved:

Howard D. W. Chapman

Regional Director, Western Region — 1-4-83 (Date)

DESCRIPTION OF NATURAL ENVIRONMENT

Geology

The Puukohola Heiau NHS is situated on the Mauna Kea dome and is composed of lava and soils derived from flows that issued from Mauna Kea. Kawaihae Village, just north of the Puukohola Heiau area, sits on soils and lava that emanated from the Kohala Volcano. Makeahua gulch divides the two volcanic areas and separates the Mauna Kea average slope of seven percent from the average fourteen percent slope of the Kohala mountains. Makeahua gulch at Kawaihae is now a deep and dry stream bed but carries flood waters occasionally. On Queen Emma lands (under the trusteeship of Queen's Medical Center) inland and to the southeast of the John Young's house ruins, rock quarry operations was carried on in the past. Quarry operations ceased in the late 1960's, and this land use appears not to be economically sound for the future. This area has not yet been donated to the park.

The many loose stones on the surface of the land near Kawaihae are probably debris from explosive eruptions of Mauna Kea. Wind erosion has carried away much of the volcanic ash laid down during eruptions to leave the stones exposed. The stones have weathered and are a typical feature of the terrain. The platforms of Puukohola, Mailekini, and Hale o Ka Puni heiau were made of such stones. Hawaiian house platforms were also assembled from them. John Young used them to build his house walls; and in later times, ranchers used them for stonewall fences. In modern times, the stones have been used in harbor, land, and road fills.

Repeated submergences and risings of the volcanic land during island creation have built sedimentary deposits which today can be identified at elevations as high as 550 feet. Although opportunity for coral growth has been slight, compared with the older islands to the northwest, an existing large stand of coral at Kawaihae was dredged in 1959 for the harbor, and piled to form the peninsula which reaches the base of Puukohola on the north and west. Brackish and freshwater springs (some carry Hawaiian names) along the shoreline have historically deterred the growth of coral. The white, sand beaches at the adjacent Samuel Spencer county park and at the Hapuna Beach State Park are products of earlier corals that grew along an older coastline. Between these rare beaches, the shoreline is usually pahoehoe lava, with narrow mud flats at the seaward end of gulches.

Soil

Soil in the Kawaihae area is of the reddish-brown variety typical of arid desert regions. Geologists term this particular soil the "Kawaihae Series." Lack of precipitation has permitted the soil to retain a high mineral content, but the organic content is slight. Where irrigation water is available, such as at the Mauna Kea Beach Hotel golf course and for some private lawns, the soil is considered good. Unirrigated, and under natural conditions, the soil supports a limited array of annual grasses, hardy shrubs, and a few long-rooted trees. The kiawe trees are a phreatophyte and this introduced tree has compounded the natural dryness of the Kawaihae shoreline by removing moisture from the soil -- moisture which would be retained if the numerous and large kiawe trees were not present.

Climate

Climate variations found in the Kohala district of the Big Island range from arid, warm desert at sea level, such as at Kawaihae, to cool, wet rain forests above the 3,000-foot elevation. This is within a span of twenty miles. Breezes blow across Kawaihae throughout the year. More than 90 percent of the days in the year are sunny and free of cloud cover. Clouds which form inland over the Kohala mountains and the Waimea plateau usually disperse before they reach the leeward coast. Mean annual temperature is about 78 degrees. Maximum reading is 91 degrees and minimum reading is 60 degrees.

Few of the frequent inland rains over the Kohala mountains reach Puukohola Heiau area. Annual precipitation at Kawaihae had a range of 9.1 inches maximum to a low of 0.2 inches over a 25-year period. The wind pattern is a predominantly offshore-onshore pattern. Cool night and early morning air produces an offshore easterly breeze; and mid-morning heating draws in marine air, producing a westerly breeze during the day until the land cools in the evening. The easterly land breeze resumes in the evening to perpetuate the cycle.

The Puukohola Heiau area seldom experiences storms. When one does occur, less than once every two years on the average, it may be intense although usually of short duration. Occasionally, a strong, gusty wind, called in the Hawaiian language the mumuku, blows from Waimea and strikes the Kawaihae vicinity. Frequently, gusts from 35-50 miles an hour occur at this site.

Usually low relative humidities occur during average days at Kawaihae. The average daily minimum in 1961 and 1962 ranged from 44.6 for the two Novembers to 51.8 for the two Mays. Average daily maximum relative humidity in the two-year study ranged from 75.6 in November to 87.0 in July. The area is a fire hazard.

Kawaihae's shoreline is subject to tsunamis originating from earthquakes in Japan, the Aleutian Islands, the South American coast, and from tsunamis generated by Hawaiian island earthquakes. Civil Defense alerts are issued several hours before the estimated arrival of a possible tsunami coming from overseas. No effective warning system exists for a locally generated tsunami. Whatever official warnings are issued, evacuation procedures are routine in low-lying areas. Puako has suffered devastation from a tsunami in recent decades, but informed opinion indicates that the shores below Puukohola should not suffer much tsunami inundation.

Coastal currents offshore off Kawaihae are usually light due to the coast's leeward location. Long-waved, tradewind-induced currents strike the Big Island's windward side from the northeast. The leeward coast is shielded from them by the island. Localized currents, most apparent when a south wind blows, move in a northerly direction parallel with the shore at Kawaihae. This south wind condition known as Kona affects the entire island chain and occurs several times a year. It can last a week or more each time. A Kona situation is the reversal of the normal trade-wind conditions.

The natural environment of today appears to be toward more dryness and more heat as compared with the natural environment circa 1791 when Puukohola Heiau was built. Especially as ranching prospered at Waimea, cattle shipping alone supported Kawaihae. This service was the lifeblood of the small village from the days when Honolulu on Oahu island, and Lahaina on Maui, emerged as the major shipping centers (about 1820) to the time when Kawaihae became a man-made harbor in 1961. Over a time, a marked change came to the leeward Kohala landscape -- especially in the Kawaihae vicinity -- as the forest receded and the streams diminished. Kawaihae's prevailing climate became drier and hotter.

Hydrology

This historical site is supplied by water from the county system. This supply appears to be more than adequate at the present. The structures and landscape features of the future surrounding industrial, residential, marine, recreational and resort developments will be supplied with abundant fresh water from the Kohala mountains. Extensive areas of irrigated greenery, such as for golf courses, and small areas of greenery in structural clusters are expected. Such green areas will be separated by the natural, unaltered, semi-barren ground with its scattered rocks. Natural areas, however, are expected to be eliminated eventually by developments. Irrigation will permit local micro-ecosystems. But macro-climatic alteration of the existing dryness and hotness could occur only if vast and drastic land-use changes occurred in the area between Waimea and Kawaihae. It is unlikely that the forest cover and stream flows will ever be restored.

Flora

The native coconut trees (Cocos nucifera) grow near the shore where there is brackish water, if man assists by planting the nuts. The native shrub ilima (Sida sp.), whose flowers were once reserved for use only by Hawaiian royalty, grows in the heiau vicinity. Where ground water is available near the shore, the introduced monkeypod (Samanae saman) and mango (Manifera indica) will grow. The introduced sisal (Agaue sisalana) is found in thick stands inland of the proposed park area along dry gulches where surface water accumulates from time to time. Introduced cactus (Opuntia megantha) dot the barren slopes inland.

Kiawe (an algaroba tree, Prosopis sp.) is a tropical legume which arrived in Honolulu via Paris in 1828 as seeds in the pockets of a Catholic priest. It spread to Hawaii island in the mid-nineteenth century and began to dominate the water's edge with the older and larger kiawe trees providing large shady areas. These large trees are prone to fall during rare wind storms, with down trunks continuing to grow. Some kiawe trees are thorny, and kiawe thickets behind shorelines impede passage and block views. Thick stands of haole-koa can also block access and passage.

In 1791, the native hardwood forests probably extended from the Kohala mountain tops downslope to within several miles of Kawaihae, with forested arms running seaward along the streambeds. The streams carried fresh water then in greater volume and more continuously than they do today. There may have been almost continuously flowing streams which reached the ocean in 1791. The forest line began to recede as Hawaiians harvested logs for ships' timbers and firewood for

the foreign vessels which visited Kawaihae when John Young was headquartered there. In the early 1800's, sandalwood was cut in quantity from the local forests for the China trade of the chiefs. New growth of sandalwood as well as other species of trees was prevented by grazing done by wandering herds of cattle and goats -- both animals introduced to Hawaii by foreigners. The fate of the native forests on the slopes between Waimea and Kawaihae was sealed with the diversion of the streams to support the growing upslope agricultural community of Waimea and its cattle industry. Fences above the 4,000-foot elevation upslope of Kawaihae now separate the cattle grazing lands from the native rain forest remnants on the tops of the Kohala mountains.

Fauna

The birds seen in the park are: white-eye, house sparrow, mynah, doves, cardinals, and francolin (partridge family). Few owls have been spotted near the pictograph area, but no identification of its species has been made. Occasionally, a large unidentified bird (grayish-brown in color) is seen close to the beach area. A section close to the beach is used as a feeding area by the francolins as the dirt and soil indicates. Infrequently, pheasants can be seen in the area.

Mongooses are seen in the area. They were introduced to the Hawaiian Islands in 1883 to control the rats. However, the rats are nocturnal and the mongooses diurnal. The mongooses have survived by eating the groundnesting birds and their eggs and other small animals, including kittens.

Rats are found in the area. The most common are the black rat and brown or Norway or wharf rat. Field mice are also seen in the area. Cats are seen and heard on rare occasions.

Honeybees make a few nests in the park area.

The geckos and skinks are seen in the area. The geckos are found on the screens looking for insects for food especially at night. Skinks are more active during the day searching for insects under the stones.

Marine Flora and Fauna

The Kawaihae Harbor revetment extends out from the inside shore boundary of this area. It is composed of basalt boulders with coral fill. This artificial facility was completed by 1959 by dredging a portion of the coral reef along the coast of Kawaihae. Prior to this construction, Kawaihae Harbor consisted of a small boat harbor and wharf which were a considerable distance from the present historic site. Eighty percent of the natural reef was destroyed within the embayment and adjacent areas through blasting and dredging activities during construction of the Kawaihae Boat Harbor in 1969-1970. Sand channels and reef debris now dominate the area although there are few live coral heads in the seaward portion of the embayment. About half of the area is silted over by alluvium deposited in part by local runoff. Water turnover within the embayment is slight because it is shallow, sheltered from the prevailing northweast trades, and because the Kawaihae Harbor revetment has blocked the current which once swept this part of Kawaihae Bay. As a consequence of the silty substratum, fine sediments in suspension reduce visibility to a mere few centimeters in some parts of the embayment.

Thirteen species of benthic algae were collected by the University of Hawaii team. Seven species from the phylum Rhodophyta, five from the phylum Chlorophyta, and one from the phylum Chrysophyta. Most are indigenous but no rare or unusual species are known to be in the area. Some are known as: Cladophora sp. (hulu-'ilio), Enteromorpha ('ele'ele), Valonia aegagrophila (līpu'upu'u), Ulva fasciata (pahapaha), Ahnfeltia concinna ('aki'aki), Grateloupia filicina (huluhulu-waena), Polysiphonia mollis (hawane), and Amansia glomerata (lipeleiao).

Although the Kawaihae reef system had one of the best developed reefs at one time in the Hawaiian islands, today its fish fauna is depauperate, perhaps due to environmental disturbances associated with harbor construction. This is more evident near the shore at Puukohola Heiau NHS. The occurrence of reef fishes is highly dependent upon proper habitat in the form of shelter and feeding sites and in the Puukohola Heiau area, the normal habitat has been drastically altered. Some of the most abundant species of fishes observed by the study team of the University of Hawaii are: Kuhlia sandvicensis (āholehole), Mugil cephalus (mullets, 'ama'ama), Mulloidichthys auriflamma (weke), Parupeneus multifasciatus (moano), Thalassoma duperreyi (hinalea), Gomphosus varius (hinalea nuku 'i'iwi), Scarus dubius and S. sordidus (parrot fish or uhu), Abudefduf abdominalis (maomao), Pomacentrus jenkinsi and Chromis ovalis (damselfish), Acanthurus triostegus (manini), Acanthurus mata, A. nigrofuscus, and A. nigroris (surgeonfishes), Ctenochaetus strigosus (kole), and Chaetodon trifasciatus and C. unimaculatus (butterfly fishes).

Sharks are frequently seen in the area. Grey reef sharks (Carcharhinus menisorrah), black tip sharks (C. melanopterus), and white tip roof sharks (Triaenodon obesus) were seen by the study team. A study should be made to see why the sharks gather in this area.

A few small moray eels are present inshore among the coral heads and boulders.

The toxic echinoids, Echinothrix calamaris and E. diadema (wana), are common in shallow waters facing the rocky natural shoreline and are hazardous to swimmers or waders in the area.

The rocks along the Kawaihae breakwater hold a narrow band of Nerites, Littorines, and Siphonaria. Grapsid crabs (Grapsus grapsus and Metagrapsus messor) are common on all rocky portions.

DESCRIPTION OF CULTURAL ENVIRONMENT

Archeology and History

With the original Hawaiians came their religious system which included worship in a special structure -- a heiau. Refinement to this basic system was introduced by a powerful Chief-Priest, Paao, who came to Hawaii about A.D 1250. He not only introduced the special heiau worship but he organized and formalized the priesthood. The luakini heiau, such as Puukohola Heiau, could be constructed only by the ruling chief. Human sacrifice was required. Because of the long and arduous rituals and ceremonies of human sacrifice, these temples and temple ceremonies were rarely conducted or constructed. Only when the Ali'i Nui was compelled to enlist the aid of the gods in a major venture did he go through these rigorous ceremonies, some of which took several months. The conquest of the entire Hawaiian Island group, a feat which had never before been accomplished, was a major venture.

At the time of Captain Cook's arrival in 1778, Kalaniopu'u was the chief of Hawaii island. Before he died, he willed his rule to his son, Kiwala'o, and to his nephew, Kamehameha, he bequeathed the guardianship of his war god, Kū kā ili moku (Ku, the island grabber). After Kalaniopu'u's death, Chief Kiwala'o's and Kamehameha's supporters instigated a fight between the two chiefs in which Kiwala'o was killed at the battle of Mokuohai between Honaunau and Ka'awaloa in Kona.

Guided by the Kahuna prophet, Kapoukahi, Kamehameha started building a great temple in 1790 near Kawaihae on a hill called "the hill of the whale." The temple was dedicated to his ancestral gods and especially to his war god, Kū kā ili moku. The temple was completed in 1791 and consecrated. Kamehameha succeeded in uniting all the islands under his rule nineteen years later, in 1810. The prophecy that started with the construction of the great temple at Puukohola was fulfilled.

John Young

While Isaac Davis and John Young were probably of co-equal value to Kamehameha I from 1790 through the conquest and securing of Kauai island in 1810, Davis, after negotiating a diplomatic acquisition of Kauai, died shortly thereafter. Young then dominated the foreign and economic affairs of the early kingdom as principal advisor to Kamehameha.

Young seems to have been involved in every event of lasting importance in Hawaii from 1790 through 1820. He was governor of Hawaii island from 1802 through 1812, and then remained the resident chief on his lands at Kawaihae until his death at the age of 90 in 1835. His grave is among those of the chiefs at the Royal Mausoleum on Oahu.

Young received at Kawaihae Hawaii's first cattle in 1793 and first horses in 1803, safeguarded Kamehameha's arsenal, built the fort which gave a Honolulu street its name, piloted foreign ships around the islands, modified Mailekini temple platform into a fort, ran extensive sweet potato farms near Kawaihae, and advised Kamehameha I in the King's dealings with westerners.

Young's houses at Kawaihae, two of them probably the first western style houses built in the islands, stood on a hill next in prominence to Pu'u Kohola. In one, Young entertained many of the famous captains and persons who came to Kawaihae seeking his approval before dealing with Kamehameha. The walls of his principal house still stand in 1982.

The largest single stacked-stone structure in the area is the foundation on which Puukohola Heiau once stood. The grass, or ti thatched heiau -- the hale mana, house of spiritual power, the lananu'u mamao, the prayer tower, a framework of ohia poles wrapped in kapa, the lele, the altar where the offerings were placed, the ki'i, carved wooden images, have long since disintegrated. It was abandoned after the ancestral religion was discarded by Liholiho, Kamehameha II, in 1819.

An older heiau called Mailekini is situated below Puukohola and is constructed in the same manner and style as Puukohola; i.e., stacked stone without mortar, three side walls open toward the ocean. It, too, is probably a luakini, a war temple, of some distant ancestors of Kamehameha I. About 1812 John Young converted this temple into a fort, complete with cannons, to guard Kawaihae Bay. The site has been studied and reported on by the Bishop Museum (Bishop Museum, December 1969).

Pelekane area, also called the King's residence, is where Liholiho, Kamehameha II, was confirmed as the Ali'i Nui, after his father's death in 1819. It was here also in 1819 that Liholiho entertained Freycinet. The King's house, according to Freycinet's description "...was but a grass hut ten to twelve feet long, and a little less in width; the floor was padded with mats, as is the custom." Work is now underway to determine the location and if possible to relocate some of these structures in the Pelekane complex.

Offshore, according to recent accounts, is an "underwater temple" dedicated to sharks. The first mention of the name, "Hale o Ka Puni," literally House of Puni, is on a map drawn by George E. Greeley Jackson in July 1883. Jackson shows the location on or near the beach just below Mailekini Heiau directly in line with the north wing wall forming a courtyard in front of the temple. It is obvious from Jackson's drawing that the Hale o Ka Puni was visible above the water near the beach in July 1883.

National Register Status

The Puukohola Heiau NHS is on the National Register of Historic Places. The three major sites, Puukohola Heiau, Mailekini Heiau, and John Young's House Site are on the park's List of Classified Structures. As a property on the National Register, all proposed Federal actions will require Section 106 clearance.

Visitor Use

On-site developments include the entrance road, a temporary above-ground gas tank and station (10' x 14'), and a temporary visitor center (20' x 48'). The temporary visitor center was opened in July 1974 and for that half a year, 2,495 visitors were counted. By July 1975 14,255 people visited the area and 3,000 more in 1976. There

is no pattern for visitation as yet. School groups are beginning to visit the area throughout the year. Peak visitor use occurs during spring vacation and summer months, starting from June to September. Camping and picnicking are not permitted. The area is used strictly for sightseeing by foot or by driving close to the heiau where one can park and walk to see other features. Eventually, the road to the heiau will be eliminated. People walk down to the bay to pole fish.

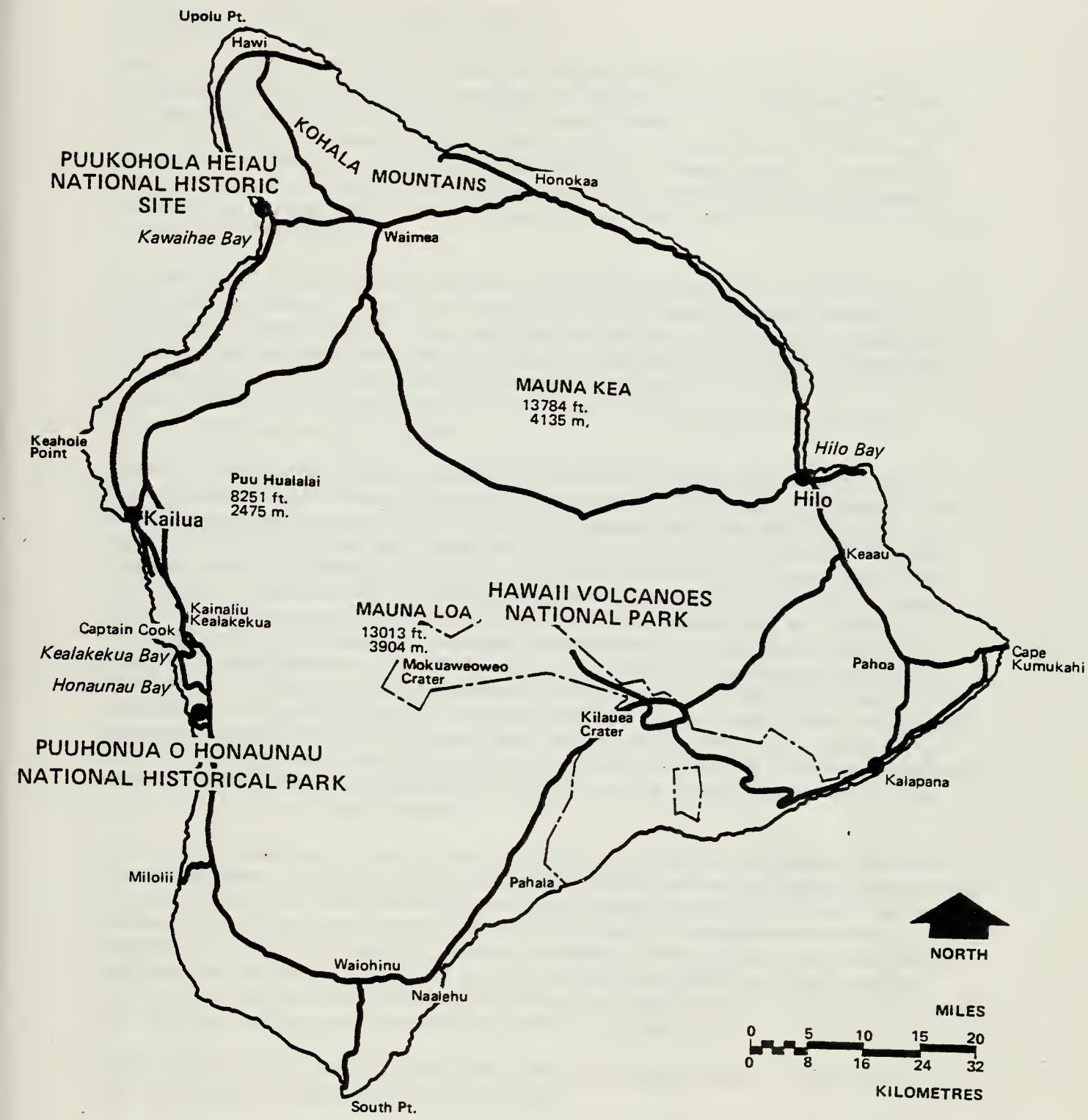

Fig 2. Island of Hawaii

LOCAL AND REGIONAL ENVIRONMENT

Next to military expenditures, Hawaii's principal sources of income are tourism, sugar, and pineapple. Both of the latter two industries are cutting back planted acreage, and two major sugar plantations have closed -- one in the district of this park. This island of Hawaii, often called the Big Island, is about twice as large in area as the other six populated islands combined. Hawaii island, in contrast to Oahu, is sparsely populated. Population increase is occurring on the Big Island's leeward, dry and usually sunny west coast. Kawaihae is one of the west coast areas undergoing development.

Air travel is the most popular means of commercial passenger transportation among the Hawaiian Islands. There was a hydrofoil ferry system between islands and there is talk of its being restored. Two certified air carriers and several air taxis give direct service several times daily to the Big Island airports of Hilo, Keahole, and Waimea-Kohala (see map: Island of Hawaii). Residents strongly opposed the idea of closing the Waimea-Kohala Airport in this district at recent public hearings on this issue.

Hawaii's "Belt Road" makes a general loop around the island and provides practical surface connections between towns and communities. Kawaihae is accessible from the belt road system via a narrow and winding paved side road from Waimea. In the near future, the State will construct a federal-aid highway from the Waimea-Kohala Airport to Kawaihae. In 1975 a road was built along the coast which links the Keahole Airport in the Kona district to Kawaihae. Justification for the new highway includes easier access from Kona to the deep water port at Kawaihae and from all parts of the island to the resort, recreational, and home developments along the coast between the Keahole Airport and Puako, a residential community just south of Kawaihae. Port facilities at Kawaihae lie near and in plain sight of Puukohola Heiau and include bulk storage facilities for raw sugar, grain, and petroleum products, general freight warehouses, and cattle holding pens. The United States Army and Marine Corps use the harbor as an ocean terminal for troops and equipment used in training inland on the slopes of Mauna Loa and Mauna Kea volcanoes (see map: Kohala Coast Resort Region).

A man-made peninsula of white coral dredged during harbor cnstruction lies below Puukohola Heiau. The Army Corps of Engineers and the State of Hawaii plan harbor improvements in the near future. These plans include another small boat harbor seaward of the submerged shark heiau and attached to the man-made peninsula. The peninsula will hold maritime support facilities. Trees, shrubs, and grassy areas are also planned for its surface. A harbor-planning task force has recommended additional waterfront and maritime facilities for the harbor and related small industries are expected in the areas immediately north of the park.

Kohala district is primarily agricultural; however, Kohala Sugar Company closed its mill in 1975. Some cattle are raised there.

The closing of the sugar company has posed economic and land use problems for north Kohala and will reduce bulk sugar shipments from the port of Kawaihae. In the southern part of the Kohala district, livestock and truck-farm agriculture center at Waimea. Kawaihae has few residents, but Puako is a residential community

of about 175 seaside lots several miles south of the port. Both Kawaihae and Puako are sustained through tourism, shipping, and retirement income. The town of Waimea, whose post office is called Kamuela, is the commercial center of the Kohala district. Waimea is the headquarters of the Parker and other ranches, and packaging point for local produce shipped both by air and barge to the Honolulu markets.

Of the relatively few sandy swimming beaches along the extensive coastline of the Big Island, most lie along the west coast, between Kailua in the Kona district and Kawaihae. One, in the Samuel Spencer County Park, adjoins the proposed historic site to the south. Another, in Hapuna Beach State Park, is south several miles along the coast. Offshore of the entire west coast of the Big Island lie world-renowned sport fishing waters.

Mauna Kea Beach Hotel is about a mile south of the park. The hotel and golf course opened in 1965 and is the only major resort in the Kohala district. The hotel's first expansion was in 1969 and its second expansion took place in 1973. The Mauna Kea Beach Hotel was an enterprise of Laurence S. Rockerfeller, whose Olohana Corporation holds development agreements for much of the lands in the Kawaihae vicinity. The hotel is now owned by United Airlines. The Corporation, in 1972, completed a low income residential community, just inland of Kawaihae. In the future, Olohana Corporation will implement other portions of its incremental resort and residential master plan between Hapuna Beach State Park on the south, and this park on the north as well as inland.

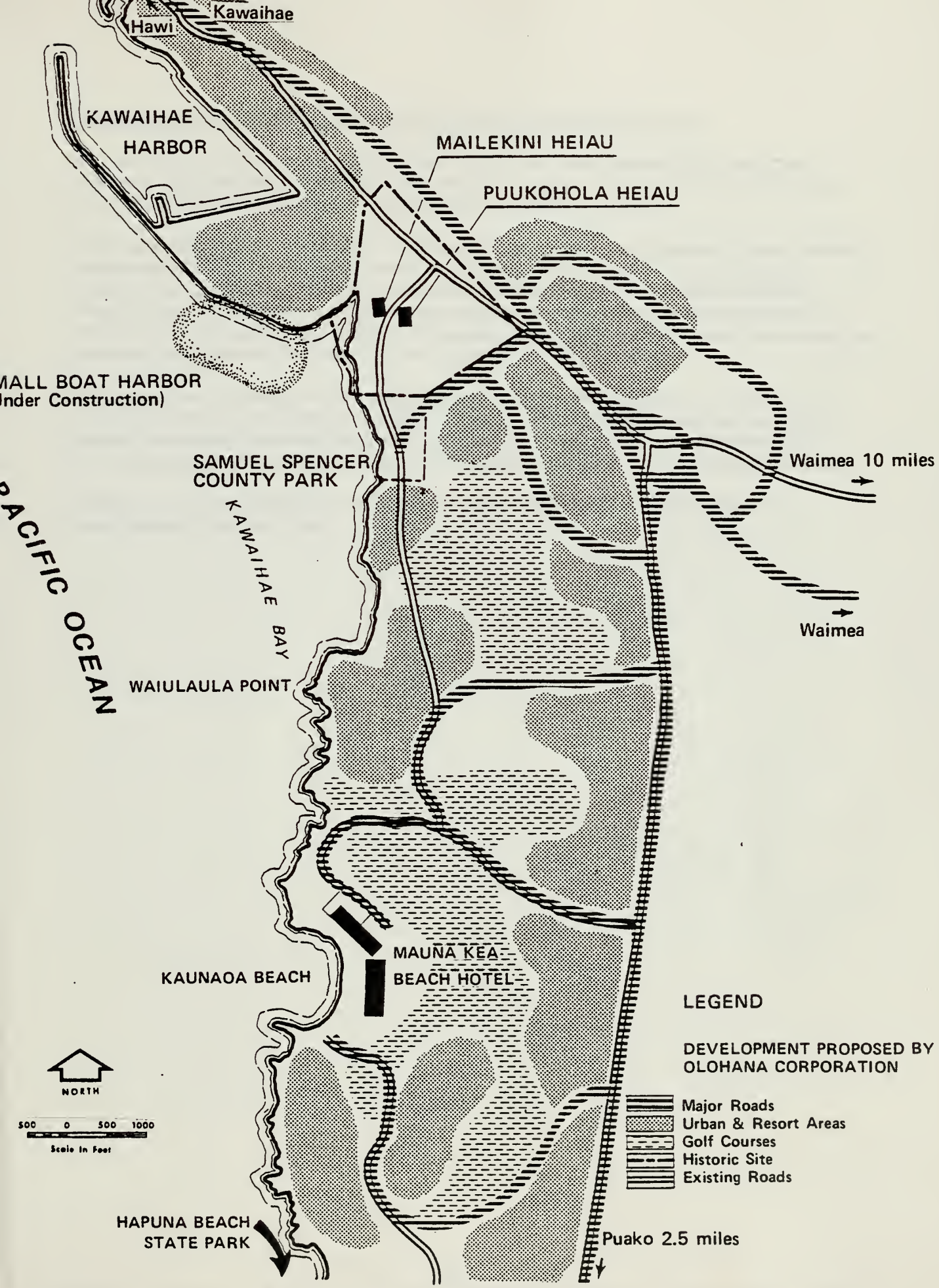

FIGURE 3. PUUKOHOLA HEIAU AND SURROUNDING KOHALA COAST RESORT REGION

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PROBABLE FUTURE ENVIRONMENT WITHOUT PROPOSED PLAN

Without the proposed plan, the Puukohola Heiau National Historic Site will not show any improvement. Although the park will be open to the public and protected as a national register property, it will remain physically as it is.

If the proposed ruins stabilization and restoration are not implemented, these cultural resources will continue to deteriorate and in time will be lost. This will create a local public relations problem. Without the proposed archeological research, future efforts to properly manage and interpret the area's archeological resources will suffer from lack of information. Available information on the area's archeological resources will remain fragmentary and of questionable accuracy.

If the proposed sociological, economical, and visitor use studies are not conducted, we will not have a thorough knowledge of the situation in this region and will not be able to manage the area properly. If there is no visitor use and interpretation plan, increasing visitor use will hasten the erosive processes on archeological sites.

Location of visitor facilities and access is being explored with preparation of a Development Concept Plan.

ENVIRONMENTAL IMPACTS OF PROPOSED PLAN

Maintaining the Natural Environment

Vegetative management and replanting of native species at Puukohola Heiau NHS call for landscaping and recreating the scene which existed during the time when the Puukohola temple was being constructed and during the residence of John Young -- circa 1790 to 1830. Such actions will be limited, at first, to select areas as determined by area research. The primary effect of vegetative management will be on the archeological and historical structures and features. Vegetation, mainly kiawe, has invaded the entire coastal zone where there were important archeological historical features. Roots and wind down trees have destroyed original fabric. Dead and dry kiawe trees and grass have built up to create fire hazard. It is therefore desirable to manually remove invading vegetation to slow down natural deterioration and to restore the landscape to the commemorated period. Major species to be affected are kiawe and buffel grass. The kiawe grove will be underbrushed and replanted with appropriate native species, such as kou, milo, and coconut.

Exotic plant control will include temporary adverse effects on the visitor. There will be periodic displeasing noises from chain saw operations. There will be minimal ground disturbance. Cut trees will be piled in small stacks to decompose naturally. Archeological and historical features will be exposed and fuel reduction will significantly reduce the fire danger. Use of herbicides will be approved prior to implementation. The cumulative long-lasting effects lie in the integrity of the park scene restored to the period of 1790-1830. Clearing and replanting will aid in preserving the archeological and historical structures and features.

Restoring the Historic Scene

At the Puukohola Heiau National Historic Site, the actions available for cultural resources management leading to preservation are: stabilization of Hawaiian stacked stone structures, historical reconstruction, landscape, and historical restoration.

Sub-surface investigations will be limited to specifically identified areas undergoing preservation treatment and will be fully documented and approved prior to any action. The ongoing actions, Emergency Preservation of Puukohola, Mailekini, and John Young's House Site are documented according to the procedures for historic preservation (Section 106). The basic stabilization plans for Puukohola and Mailekini have also been documented. A Research Design, Pre-Stabilization Plan, and Historic Structures Report for John Young's House Site are being prepared. Research plans for Hale o Ka Puni and Pelekane area are being prepared.

In summary, the direct impacts of stabilization and historic restorations, and reconstruction are confined to the subject sites and impact magnitude is correlative to the purpose and techniques employed. All management and actions plans are being planned in direct consultation with the Waimea Hawaiian Civil Club and other interested local organizations to ensure compatible development.

MITIGATION MEASURES INCLUDED IN THE PROPOSED PLAN

The Natural Environment

Areas selected by research actions will be cleared in small sections to control impacts, such as soil erosion. Large trees will be left until reintroduced native species are well established. Archeological base maps will provide guidance for vegetative clearing to ensure protection of known archeological and historical features.

Approved herbicides will be used only by trained personnel.

The Cultural Environment

All structurally weak and broken areas will be identified; pre-stabilization studies will determine the best and most effective method of stabilization with the least disturbance to the original fabric.

Review by an archeologist is required at the earliest possible stages of planning and design to determine if ground-disturbing activities will impact archeological resources. Following this preliminary survey, accurate and final design and project documents must be provided before archeological clearance can be given. If the project is changed or redesigned, new review is required. An archeological clearance may be issued only if there is no impact and a determination of no effect can be made.

An archeological clearance is required prior to the installation of utilities and maintenance, and construction projects disturbing the ground. All such utilities shall be accurately plotted on permanent plans or maps. These and as-built drawings shall be preserved for reference in future planning and development in order to design least impact construction.

Archeological clearance is based on thorough, professionally documented archeological foot survey or field inspection. This survey or inspection should be extensive enough to permit planning of alternatives. Records (field notes, photographs, maps) must be adequate to stand as documentation fulfilling a Programmatic Memorandum of Agreement between the National Park Service and the Advisory Council on Historic Preservation.

Puukohola Heiau: All compliance documents are complete. Basic stabilization is completed.

Mailekini Heiau: Same as above.

John Young's House Site: Emergency preservation work has been completed. Documents include 106 Clearance for emergency preservation. A research design and a pre-stabilization plan were developed and a Preliminary Case Report was made in consultation with the State Historic Preservation Officer and the Advisory Council. Some excavation was done by Pacific Area Archeologist Ladd in September 1978.

Hale o Ka Puni: Needed are a research design and proposal for a study to locate this alleged structure in the water off the beach at Mailekini Heiau and Pelekane area.

Pelekane Area: Map in detail the general area of the reported site which was a trash area with abandoned vehicles and boats. Junk removal was directed by the Pacific Archeologist to ensure minimum disturbance of ground area in the so-called "King's residence" area. A research design and proposal was prepared. The base maps provided guidance for action in the area and to ensure protection of known sites and features.

ADVERSE EFFECTS WHICH CANNOT BE AVOIDED SHOULD PLAN BE IMPLEMENTED

Vegetative clearing, to reintroduce native plants, involve unavoidable temporary adverse effects from chain saw noise. Removal of buffel grass will involve minimal but nonetheless adverse soil disturbance and erosion.

Puukohola Heiau: Broken areas were taken apart to preserve and protect the remaining structure -- disturbance to original fabric minimal. Compliance document complete.

Mailekini Heiau: Same as above.

John Young's House Site: Research design and pre-stabilization plans will identify areas that will be disturbed. Stabilization actions will carry adverse effects through disturbance of original in situ deposits. A public meeting was held on February 11, 1978. Removal of the covering on John Young's house site will need compliance procedure. It is still the recommended action by the Pacific Archeologist. The Pacific Historian will do research studies within the next two years but the indication is that there is insufficient evidence to supply us with full restoration at this time.

Pelekane-Hale o Ka Puni Area: Research design and proposal will develop and guide the future actions. No new ground disturbance actions are planned for these areas.

RELATIONSHIP BETWEEN SHORT-TERM USES OF ENVIRONMENT AND MAINTENANCE AND ENHANCEMENT OF LONG-TERM PRODUCTIVITY

Propagation of native plants, exotic plant control, native plant reintroduction, and brush clearing will directly affect the archeological and historical sites subject to these actions. The cumulative long-term effect of all phases of exotic plant control will be a natural environment favoring native over exotic plant species restored to the commemorated period.

The range of stabilization work proposed will add to structural stability, longevity, and protection of the cultural resources. The proposed John Young House Site stabilization and restoration will provide future visitors with interpretated features unavailable to present visitors. The long-term effect of stabilization work will be long-lived cultural environment for present and future public benefit.

Stabilization only: A program of stabilization only would include most of the proposed actions. These actions would arrest erosion by selected treatment with maximum information retrieved and minimum disturbances of resources. In this case, methodology is closely linked to impacts. Dry wall stabilization, restacking of original building stones in the Hawaiian style, may require continued maintenance but would closely resemble the original Hawaiian style of construction. Stabilization results in partial loss of original inplace association of artifacts, structures, and as they presently exist.

Conservation only: Except for full-scale excavation, stabilization, and reconstruction of John Young's House Site, all actions are aimed at conservation. Excavation as a tool will be the last to be considered in any conservation or preservation action.

Implement this plan.

MANAGEMENT PROGRAM

An Addendum
to the Natural and Cultural
Resources Management Plan
for
Puukohola Heiau National Historic Site

Prepared by

Puukohola Heiau National Historic Site
National Park Service
Department of the Interior

December 1982

MANAGEMENT PROGRAM

SUMMARY

This Management Program for Puukohola Heiau National Historic Site is a document that proposes management and research actions, which will implement the Natural and Cultural Resources Management Plan. The Plan outlines a general long-term program designed to provide for natural and cultural resource management and research. This Management Program, however, proposes specific projects to be carried out, according to availability of funds, for five years beginning with Fiscal Year 1983. The Management Program will be revised and updated annually as the need arises to add new management or research projects and to re-evaluate priorities.

The Management Program that follows contains:

A list of natural and cultural resources projects (see Table of Contents).

Natural and cultural resources project statements that serve as "blueprints" for proposed actions.

A natural and cultural resources project programming sheet listing each project in relation to park priority, funding, and time scheduling for the five-year period.

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NATURAL RESOURCES PROJECT STATEMENT

1. PARK AND REGION: Puukohola Heiau National Historic Site, Western Region

2. PROJECT NAME AND NUMBER: Fire Fuel Brush Clearing, PUHE RM-1

3. STATEMENT OF PROBLEM:

The number of fires in the vicinity of the park increased dramatically in 1980 and in 1981. In 1981 four brush fires had occurred within and adjacent to the park. Rainfall continues to be less than nine inches a year. Motor and pedestrian traffic over two major roads continue to be a problem. The dry grass must be kept mowed and hauled away, and dry tree branches trimmed. This is a continuing need, even though the park size is less than 77 acres, the existing manpower cannot handle this project.

4. WHAT HAS BEEN DONE:

We try to do some trimming but the existing manpower cannot handle this project because of the amount of work to be done and other essential services to perform.

5. DESCRIPTION OF WORK TO BE UNDERTAKEN:

Thin out, cut, and trim branches and trees in about 77 acres. The removal of plants and trees will be manual and will leave minimum fuel in case of fire.

6. LENGTH OF TIME NEEDED:

The growth is continuous and project is continuing. Nine months or 180 days is needed for three laborers each year.

7. WHAT WILL HAPPEN IF PROJECT IS NOT UNDERTAKEN:

Exotics will continue to present an eyesore to the area and will not be compatible to the historic scene. The continued growth will cause damage to the historic remains from their expanding root growth. Also, the excess of fuel could result in a damaging fire burning the archeological remains as well as the administration and visitor information office.

8. WHAT ARE THE ALTERNATIVES:

a. Burn the area causing non-selective control of all vegetation.

b. Do nothing.

9. WHO WILL ACCOMPLISH THE PROJECT:

Hire three 180-day laborers.

10. ADMINISTRATION AND LOGISTICS OF THE PROJECT:

This project may be done at any time of the year under the supervision of the park maintenance worker.

Funding	Year in Program Sequence				
	1st	2nd	3rd	4th	5th
Personal Services	40,000	40,000	40,000	40,000	40,000
Other than Personal Services	200	200	200	200	200
GRAND TOTAL	40,200	40,200	40,200	40,200	40,200

All funds requested from Regional Office

On Form	Date Submitted
10-237	09-09-81

11. REFERENCE AND CONTACTS:

Jerry Y. Shimoda, Superintendent

12. DATE OF SUBMISSION:

March 5, 1982

CULTURAL RESOURCES PROJECT STATEMENT

1. PARK AND REGION: Puukohola Heiau National Historic Site, Western Region

2. PROJECT NAME AND NUMBER: Historic Structure Report, Puukohola Heiau, PUHE A-4

3. STATEMENT OF PROBLEM:

The law authorizing the establishment of Puukohola Heiau National Historic Site mandates restoration of the heiau. The Association of Hawaiian Civic Clubs in 1979 submitted Resolution No. 11, encouraging research on the heiau so an authentic restoration may be done. The National Park Service does not have enough information on the heiau to initiate restoration at this time.

4. WHAT HAS BEEN DONE:

When Puukohola Heiau National Historic Site was proposed, some research was done by the Pacific Area Historian and is on file at Puukohola Heiau headquarters. However, there are places, such as England, France, etc., where information on Puukohola Heiau has not been sought.

5. DESCRIPTION OF WORK TO BE UNDERTAKEN:

Check all resources locally, including the Bishop Museum, Archives of Hawaii, etc. Also check with the Peabody Museum in Massachusetts and museums in England, France, etc.

6. LENGTH OF TIME NEEDED:

Estimate 8-12 months.

7. WHAT WILL HAPPEN IF PROJECT IS NOT UNDERTAKEN:

Encouraging restoration from outside the National Park System started with the Hawaii County Bicentennial Commission in 1976 passing a resolution supporting restoration of Puukohola Heiau. Then in 1979 the Association of Hawaiian Civic Clubs submitted Resolution No. 11 encouraging research so the heiau could be restored. If the project is not undertaken, the Hawaiian public could make a big issue of the shortcomings in the National Park Service's research efforts which can be embarrasing to the Park Service. The NPS credibility with the surrounding community and nearby NPS organizations will suffer. The Park has a good working relationship with native Hawaiians at the present time. The heiau is a property on the National Register and on the LCS.

8. WHAT ARE THE ALTERNATIVES:

a. Take no action.

b. Complete the project.

9. WHO WILL ACCOMPLISH THE PROJECT:

Organization of this study should be done by the Pacific Area Historian in the Pacific Area Office in Honolulu.

10. ADMINISTRATION AND LOGISTICS OF THE PROJECT:

Funding: A requisition of $7,000 can be found on 10-238, Pkg. 132.

11. REFERENCES AND CONTACTS:

a. Pacific Archeologist

b. Regional Historian

c. Pacific Area Historian

d. Superintendent

12. DATE OF SUBMISSION:

May 3, 1982

NATURAL RESOURCES PROJECT STATEMENT

1. PARK AND REGION: Puukohola Heiau National Historic Site, Western Region

2. PROJECT NAME AND NUMBER: Biology of Endangered Fern, PUHE N-1

3. STATEMENT OF PROBLEM:

The University of Hawaii CPSU reported the presence of Ophioglossum concinnum brack (pololei) present behind Puukohola Heiau. It is a candidate for the Federal List but is not currently proposed for endangered or threatened status. The Park needs to have further information on the biology of this fern in order to adequately conserve it.

There has been a fire in the area. The impact of the fire on the species is not known.

4. WHAT HAS BEEN DONE:

No study specific to this species has been made and no conservation methods are known.

5. DESCRIPTION OF THE WORK TO BE UNDERTAKEN:

The proposed study will provide information in the following areas;

a. The basic life history of the species.

b. The critical habitat of the species with special reference to Puukohola Heiau and other National Park Service areas in Hawaii.

c. Recommendations on the appropriate management methods to be used in the conservation of the species.

6. LENGTH OF TIME NEEDED:

Probably three years due to the ephemeral nature of the species and the almost total lack of information on it.

7. WHAT WILL HAPPEN IF PROJECT IS NOT UNDERTAKEN:

The species could be lost from this area. Inaction or poor management by the National Park Service could result in a lawsuit related to protection of a sensitive plant species.

8. WHAT ARE THE ALTERNATIVES:

a. Take no action.

b. Close the area of Puukohola Heiau in which species occurs. This action could require construction of a fence but would not protect the species from possible destruction by fire.

c. Initiate propagation procedures without adequate background.

9. WHO WILL ACCOMPLISH THE PROJECT:

HAVO Biologist or CPSU/UH.

10. ADMINISTRATION AND LOGISTICS OF THE PROJECT:

Funding	Year in Program Sequence		
	1st	2nd	3rd
Personal Services	5,000	5,500	6,000
Other than Personal Services	2,000	1,500	1,000
GRAND TOTAL	7,000	7,000	7,000
Funds Available in Park Base	None	None	None
Funds Requested from Regional Office	7,000	7,000	7,000

11. REFERENCES AND CONTACTS:

a. Macneil, James D. and Don E. Hemmes, 1977, Puukohola Heiau National Historic Site Plant Survey, CPSU/UH Technical Report #15, Botany Department, University of Hawaii, pp. 36

b. Department of the Interior, USFWS, 1976, Endangered and Threatened Species Plant, Federal Register, June 16, 1976, pp. 24524-24572.

c. U. S. Congress, 1975, Report on Endangered and Threatened Plant Species of the United States, 94th Congress House Document #94-51, pp. 200.

d. Fosberg, F. R. and Deral Herbst, 1975, Rare and Endangered Species of Hawaiian Vascular Plants, Allertonia 1: 1-72.

12. DATE OF SUBMISSION:

March 17, 1980

CULTURAL RESOURCES PROJECT STATEMENT

1. PARK AND REGION: Puukohola Heiau National Historic Site, Western Region

2. PROJECT NAME AND NUMBER: Historic Resources Study, PUHE A-3

3. STATEMENT OF PROBLEM: A Historic Structures Report of the John Young House Site and ruins has been accomplished but not a systematic historic study of the whole field area yet Puukohola Heiau existed almost from the beginning in historic times and was documented in drawings, photographs, and descriptions over the years which have not systematically been studied. The potential has been demonstrated in brief coverage in a road corridor survey by Barrera and Kelly which included such material covered in no NPS report, including photos which purport to be the ruins of the John Young house in the 1880's and later none of which appear in the NPS report on the Young house site. Furthermore, historic photographs, drawings, and descriptions in diaries, travel accounts and ship's logs from the 1790's on down to the present century may greatly illuminate the physical history of the historic structures and provide data about structures now gone.

4. WHAT HAS BEEN DONE:

Some archeological work has been accomplished, and a historic structures report of the John Young house complex is completed.

5. DESCRIPTION OF WORK TO BE UNDERTAKEN:

The proposed study will provide a narrative history of the heiau, the Pelekane, the Young homestead, and all other man-made features which exist now or once existed as documented in historic photographs, drawings, diaries, letters, travel accounts, ship's logs, newspapers, and other documentary source materials with special emphasis on unearthing 19th Century photographs, as well as 20th Century photographs, which show the lands and features now in the area boundary. It will document changes which have occurred to the lands and structures since the time of Kamehameha I as reflected in the documentary record. It will provide information to supplement and assist archeological and ruins stabilization work.

6. LENGTH OF TIME NEEDED:

Estimate eight months.

7. WHAT WILL HAPPEN IF PROJECT IS NOT UNDERTAKEN:

Management of the resources will continue to be based on ignorance of the resources, interpretation will be crippled by lack of relevent data and illustration, the potential will exist for studies by others outside the National Park Service to illustrate shortcomings in NPS research efforts embarassing to the Service.

8. WHAT ARE THE ALTERNATIVES:

a. Take no action.

b. Continue management and interpretation with inadequate data base.

c. Accomplish historic resources study.

9. WHO WILL ACCOMPLISH THE PROJECT:

NPS DSC Research Historian

10. ADMINISTRATION AND LOGISTICS OF THE PROJECT:

Funding: Estimated cost of $38,000 to be funded through Cultural Resources Preservation Fund or other source, as arranged through Western Regional Office.

11. REFERENCES AND CONTACTS:

a. Pacific Archeologist

b. Regional Historian

c. Pacific Historian (if position filled)

d. Authors of Hawaii Historic Preservation Report 74-1 (especially Marion Kelly)

e. Retired Pacific Historian Apple

12. DATE OF SUBMISSION:

March 23, 1982

CULTURAL RESOURCE PROJECT STATEMENT

1. PARK AND REGION: Puukohola Heiau National Historic Site, Western Region

2. PROJECT NAME AND NUMBER: Research Design and Proposal Study on Pelekane Area, PUHE A-2

3. STATEMENT OF PROBLEM:

   Pelekane area was once a courtyard and legend states that is where Queen Emma was born. Explorer Louis de Freycinet met Liholiho's (Kamehameha II) wives sitting under a lanai of a lean-to. He was treated well by Liholiho. There must have been huts and other significant features in the area.

4. WHAT HAS BEEN DONE:

   Nothing has been done.

5. DESCRIPTION OF WORK TO BE UNDERTAKEN:

   Check grid by grid for any stone formations. Identify areas that may show evidence of significant features and other disturbed areas. Do more research on the area itself.

6. LENGTH OF TIME NEEDED:

   One month.

7. WHAT WILL HAPPEN IF PROJECT IS NOT UNDERTAKEN:

   The staff will not have sufficient information to present to the public, and the resources in the area will be unidentified and therefore susceptible to damage.

8. WHAT ARE THE ALTERNATIVES:

   a. Do nothing.

9. WHO WILL ACCOMPLISH THE PROJECT:

   Pacific Archeologist

10. ADMINISTRATION AND LOGISTICS OF THE PROJECT:

    Funding: One time funding. May be done by day labor. Costs to be determined.

11. REFERENCES AND CONTACTS:

    Jerry Y. Shimoda, Superintendent

12. DATE OF SUBMISSION:

    March 17, 1980

CULTURAL RESOURCES PROJECT STATEMENT

1. PARK AND REGION: Puukohola Heiau National Historic Site, Western Region

2. PROJECT NAME AND NUMBER: Search for Underwater Temple Site, PUHE A-1

3. STATEMENT OF PROBLEM:

Old-timers in the area claim that a temple was constructed underwater and dedicated to the shark gods. Many people ask as to its whereabouts and we have no answers. Some people say the structure was a fish trap.

4. WHAT HAS BEEN DONE:

Nothing has been done.

5. DESCRIPTION OF THE WORK TO BE UNDERTAKEN:

Dive to search for the temple. Scuba diving equipment may be used. Old-timers in area can help us to determine its whereabouts. Suction pumps may be needed to remove the silt that covers the general area of the site. Once the site is found and uncovered, our archaeologist may be able to determine whether the structure is a temple or a fish trap.

Coordination will be necessary with the native Hawaiians regarding the Native American Religious Act.

Remote sensing method, such as magnatometers, may be used in locating the submerged heiau.

A literature search should be done prior to any actions taken above.

6. LENGTH OF TIME NEEDED:

Six to eight weeks.

7. WHAT WILL HAPPEN IF PROJECT IS NOT UNDERTAKEN:

The location and nature of the structure will remain a mystery.

It is important that the presence and nature of this resource be verified so that the cultural significance of Puukohola Heiau can be evaluated in full.

If the structure was a wooden platform, the longer the project is delayed, the more likely its remains will deteriorate irretrievably.

8. WHAT ARE THE ALTERNATIVES:

a. Take no action.

b. Interpret the site on hearsay.

9. WHO WILL ACCOMPLISH THE PROJECT:

Pacific Archeologist or CPSU/UH.

10. ADMINISTRATION AND LOGISTICS OF THE PROJECT:

Contract -- This project has to be done by experts and a cost estimate developed.

11. REFERENCES AND CONTACTS:

Jerry Y. Shimoda, Superintendent

12. DATE OF SUBMISSION:

March 17, 1980

NATURAL RESOURCE PROJECT STATEMENT

1. PARK AND REGION: Puukohola Heiau National Historic Site, Western Region

2. PROJECT NAME AND NUMBER: Shark Study at Puukohola Heiau NHS, PUHE N-2

3. STATEMENT OF PROBLEM:

Sharks frequent the bay in the shallow waters fronting Pelekane (courtyard). Spencer Beach Park is adjacent to this park but the swimmers are not bothered by the sharks. The sharks stay close to the apparent site of Hale o Ka Puni (submerged heiau). What causes or attracts the sharks within this specific area is a mystery to all. The Park needs a study to get more information on the sharks in the area and the reason they frequent this area.

This project is associated with Project Plan, Search for Underwater Temple, PUHE A-1. There is concern that this may be covered by the Native American Religious Act.

4. WHAT HAS BEEN DONE:

No research or study has been done.

5. DESCRIPTION OF WORK TO BE UNDERTAKEN:

The proposed study will provide information on the reason for the sharks to stay close to the specific area and the types of sharks seen in the area.

6. LENGTH OF TIME NEEDED:

At least three years of observation and study.

7. WHAT WILL HAPPEN IF PROJECT IS NOT UNDERTAKEN:

We will not have any credible information to pass along to all those that inquire about the situation.

The possible link between the sharks and the heiau would not be known. Construction of a harbor nearby may affect this study. We need to know now rather than after the fact.

8. WHAT ARE THE ALTERNATIVES:

a. Take no action.

b. Interpret the site on obvious presence of sharks.

9. WHO WILL ACCOMPLISH THE PROJECT:

CPSU/UH or Private Researchers.

10. ADMINISTRATION AND LOGISTICS OF THE PROJECT:

Funding	Year in Program Sequence			
	1st	2nd	3rd	4th
Personal Services	0	15,000	16,000	17,000
Other than Personal Services	0	8,000	8,000	9,000
GRAND TOTAL	0	23,000	24,000	26,000

11. REFERENCES AND CONTACTS:

Dr. R. A. Kinzie, III, Department of Zoology, University of Hawaii.

Dr. R. S. Nolan, Ocean Consulting and Analysis, Kawaihae, Hawaii, 1977, Lost Shark Temple, Skin Diver

Cheney, D.P., D. E. Hemmes, and R.S. Nolan, 1977, The Physiography and Marine Fauna of Inshore and Intertidal Areas in the Puukohola Heiau National Historic Site, CPSU/UH Technical Report #13.

12. DATE OF SUBMISSION:

March 17, 1980

NATURAL RESOURCES PROJECT STATEMENT

1. PARK AND REGION: Puukohola Heiau National Historic Site, Western Region

2. PROJECT NAME AND NUMBER: Sociological, Economic and Visitor Use Study, PUHE N-4

3. STATEMENT OF PROBLEM:

   A thorough knowledge of the socio-economic situation with an analysis of visitor use pattern and potential are needed to provide the highest quality of management. Also needed is information on what facilities for park management and visitor accommodation might be provided by the community.

   This information is needed for adequate planning of new headquarters.

4. WHAT HAS BEEN DONE:

   Nothing has been done.

5. DESCRIPTION OF THE WORK TO BE UNDERTAKEN:

   Complete professionally planned and conducted sociological, economical, and visitor use studies.

   Puukohola Heiau is a special Hawaiian cultural resource yet it is probably visited by more non-Hawaiians. It is vitally important that interpretation be meaningful to the non-Hawaiian yet sensitive to the concerns of the Hawaiians.

6. LENGTH OF TIME NEEDED:

   Two years.

7. WHAT WILL HAPPEN IF PROJECT IS NOT UNDERTAKEN:

   There is a very real potential to alienate the Hawaiian community and/or misinterpret the site for Caucasians. Since the area is off the tourist runs, the type of visitor may be different from those in packaged tours. However, it is important that the historical and partially socio-religious aspects be maintained.

8. WHAT ARE THE ALTERNATIVES:

   a. Take no action.

9. WHO WILL ACCOMPLISH THE PROJECT:

   CPSU/UH.

10. ADMINISTRATION AND LOGISTICS OF THE PROJECT:

Funding	Year in Program Sequence		
	1st	2nd	3rd
Personal Services	0	8,000	9,000
Other than Personal Services	0	5,000	2,000
GRAND TOTAL	0	13,000	11,000

11. REFERENCES AND CONTACTS:

Jerry Y. Shimoda, Superintendent

12. DATE OF SUBMISSION:

March 17, 1980

NATURAL RESOURCES PROJECT STATEMENT

1. PARK AND REGION: Puukohola Heiau National Historic Site, Western Region

2. PROJECT NAME AND NUMBER: Tsunami Study at Puukohola Heiau NHS, PUHE W-1

3. STATEMENT OF PROBLEM:

   To be able to plan visitor facilities wisely, we must know how many tidal waves have affected this area and the extent of damages occurred to exact locations. Executive Order 11988, furthered by the National Park Service Floodplain Management Guide, mandates that each park will assess its area for floodplains (floodplains by definition include areas inundated by flood waves or tsunamis).

   The construction of the Kawaihae Harbor seawall could act as a focusing agent for tsunamis coming from particular angles. If that concern is true, damage to all heiau sites and the John Young House Site could be extensive either by direct inundation or erosion of the foundations.

4. WHAT HAS BEEN DONE:

   Nothing has been done.

5. DESCRIPTION OF WORK TO BE UNDERTAKEN:

   Statistics of all tidal waves and damages to specific locations must be compiled.

   Evaluation of the potential impact of tsunamis from all possible directions on the proposed headquarters site and all historic sites is needed.

6. LENGTH OF TIME NEEDED:

   One year.

7. WHAT WILL HAPPEN IF PROJECT IS NOT UNDERTAKEN:

   Precautionary measures that could have been undertaken to protect important areas could not be followed. Service non-compliance with Executive Order 11988.

8. WHAT ARE THE ALTERNATIVES:

   a. No action will be taken.

   b. Reliance on unscientific evaluation.

9. WHO WILL ACCOMPLISH THE PROJECT:

   Contract engineer or through CPSU/UH or Denver Service Center. Possibly the Tsunami Warning Center will be able to assist.

10. ADMINISTRATION AND LOGISTICS OF THE PROJECT:

Personal Services	13,000
Other than Personal Services	2,000
GRAND TOTAL	15,000

11. REFERENCES AND CONTACTS:

Tsunami Warning Center

It is recommended that initial contact for implementation of this project be made through the Division of Water Resources, Western Region.

12. DATE OF SUBMISSION:

March 17, 1980

NATURAL RESOURCES PROJECT STATEMENT

1. PARK AND REGION: Puukohola Heiau National Historic Site, Western Region

2. PROJECT NAME AND NUMBER: Water Resources Management Plan, PUHE W-2

3. STATEMENT OF PROBLEM:

The pond and stream collects water from heavy rains and gulch. It overflows into the Park causing erosion to about one to two acres of land. The debris empties into the costal waters. Flash floods upland cause the area to flood about three to four times a year. In compliance with Public Law 92-500 (Federal Water Pollution Control Act of 1977) and as amended by Public Law 95-217 (Clean Water Act of 1977), and as furthered by the Service Memorandum of Understanding with Environmental Protection Agency (EPA), each area must develop a park water plan.

4. WHAT HAS BEEN DONE:

Nothing has been done. No comprehensive water quality management plan has been developed for the area.

5. DESCRIPTION OF WORK TO BE UNDERTAKEN:

Study the source of water collected in the pond and stream, determine the cause, research for alternative solutions, establish a water standard and work to meet the established standard. Hydrologic conditions should be compatible with restoration of the historic scene.

6. LENGTH OF TIME NEEDED:

Unknown at this time.

7. WHAT WILL HAPPEN IF PROJECT IS NOT UNDERTAKEN:

The pond and stream contain rubbish and stagnant water. The polluted condition is a detraction of the sense of the park and sometimes the pond smells. The Park trail will continue to be closed during flooding and for about a week or two thereafter until the area is dry enough to walk on. Erosion within the Park will continue. The National Park Service is obligated to comply with all Federal laws stated in item 3 above.

8. WHAT ARE THE ALTERNATIVES:

a. No action will be taken.

9. WHO WILL ACCOMPLISH THE PROJECT:

The study and project can be done by CPSU/UH.

10. ADMINISTRATION AND LOGISTICS OF THE PROJECT:

Unknown at this time. Costs to be determined.

11. REFERENCES AND CONTACTS:

Jerry Y. Shimoda, Superintendent

12. DATE OF SUBMISSION:

March 17, 1980

NATURAL RESOURCES PROJECT STATEMENT

1. PARK AND REGION: Puukohola Heiau National Historic Site, Western Region

2. PROJECT NAME AND NUMBER: Sub-surface Water Supply Study, PUHE W-3

3. STATEMENT OF PROBLEM:

Sub-surface water seeps into coastal waters between the coral fill area of the State of Hawaii and Spencer Beach County Park, with Puukohola Heiau. A study is needed to determine how much, how, and to what extent sub-surface water is emptying into or affecting coastal waters because of the number of animals and fishermen who enter the ocean. In compliance with Public Law 92-500 (Federal Water Pollution Control Act) and as amended by Public Law 95-217 (Clean Water Act of 1977), and as furthered by the Service Memorandum of Understanding with Environmental Protection Agency, each area must develop a park water plan.

4. WHAT HAS BEEN DONE:

Nothing has been done. No comprehensive water quality management plan has been developed for the area.

5. DESCRIPTION OF WORK TO BE UNDERTAKEN:

To determine the points of major sub-surface water emptying into coastal waters, determine content and to what extent coastal waters are being affected, either good, bad, or otherwise, by those streams.

6. LENGTH OF TIME NEEDED:

Unknown.

7. WHAT WILL HAPPEN IF PROJECT IS NOT UNDERTAKEN:

The effect sub-surface waters flowing into coastal waters will remain unknown, probably for the worse.

8. WHAT ARE THE ALTERNATIVES:

a. No action will be taken.

9. WHO WILL ACCOMPLISH THE PROJECT:

Study can be done by CPSU/UH.

10. ADMINISTRATION AND LOGISTICS OF THE PROJECT:

Unknown at this time. Costs to be determined.

11. REFERENCES AND CONTACTS:

Jerry Y. Shimoda, Superintendent

12. DATE OF SUBMISSION:

March 17, 1980

CULTURAL AND NATURAL RESOURCES PROJECTS PROGRAMMING SHEET

December 1982

PUUKOHOLA HEIAU NATIONAL HISTORIC SITE, HAWAII

NPS COSTS EXPRESSED IN $1,000

Area Priority	Reference No.	Project Title	Yr. 1 ('83) *NEW	Yr. 2 ('84) *NEW	Yr. 3 ('85) *NEW	Yr.4 ('86) *NEW	Yr.5 ('87) *NEW	237	238
1	RM-1	Fire Fuel Brush Clearing	40.2	40.2	40.2	40.2	40.2	026	
2	N-8	Historic Structure Report, PUHE	7.0						132
3	N-1	Biology of Endangered Fern	7.0	7.0	0 7.0			035	
4	A-3	Historic Resources Study	38.0						150
5	A-2	Research Design and Proposal Study on Pelekane Area		Costs to be determined					138
6	A-1	Search for Underwater Temple Site		12.0					803
7	N-2	Shark Study at Puukohola Heiau NHS		23.0	24.0	26.0			151
8	N-4	Sociological, Economic and Visitor Use Study		13.0	11.0			034	
9	W-1	Tsunami Study at Puukohola Heiau NHS		15.0				037	
10	W-2	Water Resources Management Plan		Costs to be determined					139
11	W-3	Sub-Surface Water Supply Study		Costs to be determined				036	

*NEW All costs on this sheet are new funds requested from Western Regional Office. None are available in park base.